Attachment A

Declaration of Michael D. Topper

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Special Access Rates for Price Cap Local Exchange Carriers	WC Docket No. 05-25, RM 10593

Declaration of
Michael D. Topper
On Behalf of Verizon and Verizon Wireless

I. Introduction and Summary

A. Qualifications

1. I am Vice President and Head of the Antitrust & Competition Practice at Cornerstone Research. I have been a faculty member in the Department of Economics at the College of William & Mary, and a lecturer in the Department of Economics at Stanford University. While at William & Mary and Stanford, I taught courses in microeconomics, econometrics, and antitrust economics. I have a Ph.D. and M.A. in Economics from Stanford University. I also received a B.S. in Systems Engineering from the University of Virginia and an M.S. in Engineering Economic Systems from Stanford University.

2. Before receiving my doctorate in economics, I worked as an engineering economist at Bell Laboratories and Bell Communications Research. In my fifteen years at Cornerstone Research, my consulting work has focused on the application of microeconomics, econometrics, and quantitative analysis to litigation and regulatory matters. I have worked on numerous consulting projects in the telecommunications industry, including antitrust, merger review, spectrum policy, intellectual property, breach of contract, and securities issues. My CV is included here as Attachment A.

B. Scope of Testimony

3. On January 31, 2005, the Federal Communications Commission (FCC, or Commission) issued an Order and Notice of Proposed Rulemaking (NPRM),[1] in which it requested comment on the appropriate regulation of special access services provided by incumbent local exchange carriers (ILECs) following the expiration of the then-current regulatory regime established by the Commission's CALLS Order.[2] The Commission

[1] Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25, AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, RM-10593, Order and Notice of Proposed Rulemaking, 20 FCC Rcd 1994, 2005. ("Special Access NPRM").

[2] Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, CC Docket Nos. 96-262 and 94-1, Sixth Report and Order, Low-Volume Long Distance Users, CC Docket No. 99-249, Report and Order, Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Eleventh Report and Order, 15 FCC Rcd12962 (2000) (CALLS Order), aff'd in part, rev'd in part, and remanded in

subsequently issued a Public Notice on November 5, 2009 in which it invited comment on "an appropriate analytical framework for examining the various issues that have been raised in the Special Access NPRM."[3] The Commission seeks "concrete suggestions" for analytical methods it can use to determine whether the current special access pricing flexibility and price cap rules have fostered effective competition for special access services.

4. I have been asked by Verizon and Verizon Wireless to address, from the vantage point of economics, the appropriate analytical framework for the Commission as it evaluates competition to provide high-capacity services and determines whether existing regulation of ILEC-supplied DS-1 and DS-3 services ("special access services") promotes effective competition in the provision of high-capacity services.[4]

C. Summary of Conclusions

5. The Commission should rely on the following broad, general principles of regulatory and competition economics as it conducts its analysis:

- Markets with a relatively small number of competitors can exhibit vigorous competition and yield large customer benefits, despite the fact that their structure is not entirely consistent with the textbook model of a perfectly competitive market.
- The appropriate benchmark for evaluating competition among providers of high-capacity services is not whether the industry exemplifies the theoretical ideal of perfect competition, but rather whether competition among existing firms and

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part, Texas Office of Public Util. Counsel et al. v. FCC, 265 F.3d 313, 5th Cir. (2001) cert. denied, National Association of State Utility Consumer Advocates v. FCC, 535 U.S. 986 (2002); on remand, Access Charge Reform; Price Cap Performance Review for LECs; Low-Volume Long Distance Users; Federal-State Joint Board on Universal Service, CC Docket Nos. 96-262, 94-1, 99-249 and 96-45, Order on Remand, 18 FCC Rcd 14976 (2003) (CALLS Remand Order).

[3] Parties Asked to Comment on Analytical Framework Necessary to Resolve Issues in the Special Access NPRM, WC Docket No. 05-25, Public Notice, November 5, 2009. ("Special Access 2009 Public Notice")

[4] This report uses the term "special access services" to refer to ILEC-supplied DS-1 and DS-3 services, which are currently subject to FCC regulation, and uses the term "high capacity services" to refer broadly to all forms of high-capacity network transport service, regardless of technology or supplier identity. Special access services are thus a subset of high-capacity services.

entrants is leading to customer benefits such as lower prices, increased output, and new and improved services.

- Price regulation imposes significant costs, especially in marketplace settings with multiple competitors, rapidly changing technology and dramatic growth in demand. Thus, even if the Commission were to find that competition in the provision of high-capacity services is less than perfect, it does not follow that price regulation of special access services should be expanded.

- The general policy goal of the Commission with respect to special access services should be to promote the further development of a competitive marketplace, with regulatory intervention reduced and eventually eliminated as the marketplace becomes more competitive.

6. Beyond these general guidelines, the framework that the Commission uses in its analysis should reflect the following conclusions regarding specific measures of competition in the supply of high-capacity services:

- Market structure metrics such as market shares do not provide a meaningful basis for evaluating the current regulation of special access services because of, among other things, the dynamic nature of the marketplace and presence of self-supply.

- Many suppliers are competing to provide high-capacity services using a wide range of technologies, including competitive fiber, fixed wireless, and cable. Dramatic increases in demand are improving the business case for these competitive providers.

- The Commission's analytical framework should include all viable competitors to regulated, price-capped special access services, regardless of underlying technology, and should consider the impact of changes in demand and technology on the competitive position of different providers of high-capacity services. The Commission's analysis should also account for the pricing discipline that this range of competitive alternatives imposes on the pricing of ILEC special access services.

- Evidence of successful and continuing entry constitutes direct evidence that market-based mechanisms for price discipline are functioning and will constrain attempts to charge supracompetitive prices, in which case additional price regulation is likely unnecessary.
- The economic characteristics of the demand for special access and other high-capacity services are highly relevant for the Commission's analysis of competition. The Commission should carefully consider significant increases in demand for high-capacity services by enterprise and mobile wireless customers, which improves the business case for competing providers; the fact that demand is geographically concentrated, which facilitates competitive entry; and the fact that many buyers of high-capacity services are large, highly sophisticated organizations who operate in many locations.
- A highly granular definition of geographic market boundaries at the building or city block level will understate the degree of competition in a given area and thus yield an economically incorrect result. The appropriate geographic unit of analysis should account for potential competition as well as actual competitive entry.
- The volume and term discounts and early termination fees contained in some ILEC special access discount plans and contract tariffs are mutually beneficial, reflect an attempt by incumbent providers to differentiate their service offerings in response to customer demand and competitive pressure, and can enhance economic efficiency by reducing the costs of customer churn.
- The decline in special access prices, coupled with the increased quantity of special access and other high-capacity services provides direct evidence that the competitive market setting is benefitting customers.
- Accounting rate of return data cannot be used to infer the economic profits that ILECs are realizing from special access services, nor should such data be used for ratemaking purposes. The Commission should continue to reject any analysis that

relies on accounting rates of return to determine whether additional regulation of ILEC special access services is warranted.

- Instead, the Commission should follow accepted economic methods and consider the wide range of marketplace evidence identified throughout this paper – declines in the prices of special access services, increases in output of special access and other high-capacity services, entry by rivals to the incumbent carriers in response to market opportunities, pricing discipline imposed by potential competition, changes in demand and cost conditions – to evaluate the state of competition in high-capacity services and current regulation of ILEC special access services.

7. The remainder of this paper provides support for these conclusions. Section II briefly reviews the history and current status of special access services regulation. Section III discusses several general economic principles that should guide the Commission's current assessment of competition and the need (if any) for additional regulation of special access services. Section IV discusses the marketplace evidence that should (and should not) be considered in the Commission's analytical framework.

II. Regulation of Special Access Services

8. Special access refers to dedicated, point-to-point, high-capacity transport service provided by ILECs.[5] Special access services provide "dedicated facilities that run directly between the end user and another carrier's point of presence (POP) or between two discrete end user locations."[6] These dedicated high-capacity services are typically provided either directly to end users or to other telecommunications carriers or wireless providers, who then package and resell those services to end users or use them to transport traffic within their own networks.[7] Special access is not a homogeneous service. The Commission divides special access into channel terminations, between an end user and a wire center, and transport, between a wire center and a carrier point of

[5] Special Access 2009 Public Notice, fn. 3.

[6] See Special Access NPRM, ¶ 7.

[7] See Special Access NPRM, ¶ 3: "[B]usiness customers, commercial mobile radio service (CMRS) providers, interexchange carriers (IXCs), and competitive LECs all use special access as a key input in many of their respective service offerings."

presence. Special access services vary by capacity, reliability, transport technology, and other technical factors.

9. The specific services at issue in this regulatory proceeding — ILEC-supplied DS-1 and DS-3 — are at the lower end of the spectrum of high-capacity services.[8] Optical carrier (OC-x) special access services supplied by ILECs and competing suppliers offer much higher bandwidth and are not subject to price regulation.[9] The ILEC-supplied special access services at issue in this proceeding are just one part of a broader range of high-capacity services offered by competing fiber, cable, and fixed wireless suppliers.

10. Although ILEC provided DS-1 and DS-3 services are regulated, similar high-capacity services provided by competing providers are not regulated. A brief history provides some context for the current regulatory environment.[10] Because ILECs initially controlled virtually all dedicated access connections, the Commission regulated prices for such services. The Commission first implemented the current price cap regulatory system in 1991. In 1999, following the passage of the Telecommunications Act of 1996, the Commission issued its Pricing Flexibility Order,[11] which established a two-tiered system for deregulation of DS-1 and DS-3 prices in metropolitan statistical areas (MSAs) in which ILECs could demonstrate that certain competitive triggers had been met.[12] Phase I price flexibility grants ILECs the ability to reduce but not raise prices by offering individual contracts for special access services. Phase II grants full pricing flexibility from pricing regulation under Part 69 of the Commission's rules. The Commission further reformed its price cap rules in 2000 with the CALLS Order, which provided for yearly reductions in price caps for special access services. As noted above, the 2005 expiration of the CALLS order price cap reductions triggered the current Special Access

[8] DS-1 and DS-3 carry 1.544 and 45 megabits per second, respectively.

[9] For example, OC-1 and OC-3 carry 51.84 and 155.52 megabits per second, respectively.

[10] For a more detailed history, see Special Access NPRM, ¶¶ 7-21.

[11] Access Charge Reform, CC Docket No. 96-262, Fifth Report and Order and Further Notice of Proposed Rulemaking, 14 FCC Rcd 14221, 1999. ("Pricing Flexibility Order")

[12] The Commission grants Phase I flexibility for dedicated transport prices in an MSA in which competing carriers collocate equipment either in 15% of the incumbent's wire centers, or in wire centers that account for 30% of the incumbent's special access revenue for the MSA. The collocation thresholds for Phase II pricing flexibility for dedicated transport are 50% of all wire centers within an MSA, or wire centers accounting for 65% of the incumbent's special access revenue for the MSA. The Commission established a similar structure with somewhat higher thresholds for flexible pricing of the channel termination (i.e., local loop) component of special access circuits.

NPRM proceeding. Since the 2005 expiration of the CALLS order, price caps have remained frozen at their 2005 levels, and ILECs have continued to move from capped prices to Phase I and II price flexibility as competitive triggers are satisfied.

11. As of 2009, the Commission had granted Phase II (i.e., full) pricing flexibility in approximately one-third of all MSAs and Phase I (i.e., partial, downward) pricing flexibility in another one-third, but has not granted any pricing flexibility in the remaining MSAs.[13] Thus special access prices remain capped in up to two-thirds of all MSAs. Pricing flexibility relief for end-user channel terminations, or so-called last mile facilities, is even more limited. For example, Verizon has obtained full pricing flexibility for end user channel termination in just 12 percent of the MSAs where its price-cap LECs provide special access services.[14] Verizon has not obtained Phase II end user channel termination pricing flexibility for its most populous MSAs, such as New York, Boston, Washington, DC and Los Angeles.[15] Further, most non-MSA areas continue to be regulated under price cap or rate-of-return regulation. Even in those areas where an ILEC has been granted Phase II pricing flexibility, it still must operate under regulatory oversight, with its rates, terms and conditions filed in public tariffs and subject to Commission rules and enforcement actions.

III. Economic Principles for the Regulation of Special Access Services

A. Competitive Markets Best Serve Consumer Interests

12. Economists have long recognized that consumers are best served by competitive markets. In the short run, the competitive market mechanism disciplines prices, ensures that firms operate at an efficient scale using cost-minimizing production technology, and forces the exit of inefficient firms whose resources would be better used elsewhere. In addition to static, short-run efficiency in resource allocation, a competitive market also creates incentives that lead to long-run, dynamic efficiency. Perceived profit

[13] *Ex parte* letter from Glen Reynolds, USTelecom, to Marlene Dortch, FCC, WC Docket No. 05-75, July 30, 2009.

[14] *Ex parte* letter from Donna Epps, Verizon, to Marlene Dortch, FCC, WC Docket No. 05-25, October 27, 2009.

[15] *Ex parte* letter from Donna Epps, Verizon, to Marlene Dortch, FCC, WC Docket No. 05-25, October 27, 2009.

opportunities induce firms to invest in cost reduction, technical innovation, and new products and services. All of this occurs by means of the decentralized decisions made by individual agents in the market in response to prices. The market yields an optimal, welfare-maximizing outcome through distributed, decentralized decisions.[16]

13. While the beneficial welfare and efficiency properties of competition are often articulated in textbooks using a theoretical model of perfect competition, economists recognize that markets with a relatively small number of competitors can exhibit vigorous competition and yield large consumer benefits despite the fact that their structure is not entirely consistent with the textbook model of a perfectly competitive market.[17] In many U.S. industries, a small number of firms compete vigorously against each other, providing benefits to consumers and creating incentives for investment and innovation. For example, concentration in the U.S. brewing industry has steadily increased over time, but economists who study the industry deem it competitive.[18] Similarly, the airline industry is workably competitive despite the fact that concentration is high on some city-pair routes.[19]

B. Perfect Competition is Not an Appropriate Benchmark for Assessing Regulation of Special Access Services

14. While perfect competition can be useful as a theoretical ideal, economists have long recognized that real-world markets almost always violate the formal assumptions of

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[16] In the textbook model of perfect competition, firms are price takers, products are perfect substitutes, and firms can freely enter and exit. For a discussion of the perfectly competitive market model, see Robert Pindyck and Daniel Rubinfeld (2001), *Microeconomics*, Prentice Hall, 5th ed., pp. 252-253. See also Dennis Carlton and Jeffrey Perloff (2005), *Modern Industrial Organization*, Addison Wesley, 4th ed., pp. 56-57.

[17] See also Louis Kaplow and Carl Shapiro (2007), "Antitrust," in A. Mitchell Polinsky and Steven Shavell (eds.), *Handbook of Law and Economics*, Elsevier, Ch. 15, Vol. 2, p. 1088: "[I]n industries in which marginal cost is below average cost and capacity constraints are not binding, nontrivial technical market power may be consistent with what are normally considered competitive industries."

[18] Market share held by the top five U.S. brewers grew from 19% in 1949 to 83.9% in 2006, but other indicia of competition, including price and non-price competition and patterns of entry and exit, mark the industry as competitive. See Kenneth Elzinga (2009), "The Beer Industry," in James Brock (ed.) *The Structure of American Industry*, Prentice Hall, 12th ed., Ch. 12, pp. 128-154.

[19] See Severin Borenstein (1992), "The Evolution of Airline Competition," *Journal of Economic Perspectives*, Vol. 6, No. 2. pp. 45-73. The transition from regulation to a competitive market structure, which began in 1977, yielded many of the benefits predicted by advocates of deregulation. See Clifford Winston (1993), "Deregulation: Days of Reckoning for Microeconomists," *Journal of Economic Literature*, Vol. 31, No. 3, pp. 1263-1289.

the perfect competition model.[20] Markets deviate from the textbook model for a variety of reasons, including product differentiation and economies of scale and scope in production technology.[21] In the telecommunications industry, for example, the minimum efficient scale of production has historically been large relative to overall market size, and an efficient, cost-minimizing firm must therefore incur large fixed costs, many of which are sunk and therefore risky, in order to capture economies of scale and scope in production technology.[22] As a result, an efficient market structure will include a relatively small number of cost-minimizing competitors, and average costs that exceed marginal costs.[23]

15. In the presence of significant fixed costs and scale economies, average prices above marginal costs and relatively few suppliers are not conclusive evidence of the need for price regulation or antitrust intervention. As the Antitrust Modernization Committee points out in its report, "[a]ntitrust analysis also must recognize that a price above

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[20] See Kaplow and Shapiro (2007), p. 1079: "In practice *almost all firms have some degree of technical market power*. Although the notion of a perfectly competitive market is extremely useful as a theoretical construct, *most real-world markets depart at least somewhat from this ideal*. An important reason for this phenomenon is *that marginal cost is often below average cost, most notably for products with high fixed costs* and few or no capacity constraints, such as computer software, books, music, and movies. *In such cases, price must exceed marginal cost for firms to remain viable in the long run.*" (Emphasis added.)

See also Carlton and Perloff (2005), p. 84: "The model of perfect competition is directly relevant only to a few markets, and much of this book is devoted to analyzing the consequences of more realistic models of economic behavior." See also Carl Shapiro (1995), "Mergers with Differentiated Products," Address before the American Bar Association, November 9, reprinted in Antitrust, Spring 1996. Shapiro observes [emphasis added]: "[e]conomists have long realized that firms selling differentiated products have some 'market power' in a technical economic sense, although *typically not nearly enough to rise to the level of 'monopoly' power*."

[21] A firm's costs exhibit economies of scale over a certain range of output if average costs decline over that range, or, equivalently, if the elasticity of total costs with respect to output is less than 1 (i.e., total costs increase by less than 1% given a 1% increase in output). See Carlton and Perloff (2005), pp. 36-39. Production costs exhibit economies of scope if joint production of two products yields lower total costs than the combined production costs of two single-product firms. See also Carlton and Perloff (2005), pp. 44-47.

[22] See, for example, Jerry Hausman (2003), "Regulated Costs and Prices in Telecommunications," in Gary Madden (ed.), *International Handbook of Telecommunications*, Ch. 10, p. 211: "Most economists would agree that perfect competition cannot yield the appropriate standard since prices set at marginal cost will not allow a privately owned utility to earn a sufficient return on capital to survive. The large fixed costs of telecommunications networks thus do not allow the 'price equals marginal cost' standard of perfect competition to be used." (Internal citation omitted.)

[23] See John Sutton (1991), "Sunk Costs and Market Structure," MIT Press, p. 9: "... where sunk costs are exogenous, and where firms offer a homogenous product, the equilibrium level of concentration declines with the ratio of market size to setup cost." See also p. 25: "Thus a lower bound to industry concentration exists, corresponding to a configuration in which the industry consists of a number of firms operating at a level of output equal to the [minimum efficient scale]."

marginal cost, by itself, does not necessarily suggest that a firm has market power that should be relevant in an antitrust matter or is operating anticompetitively in a relevant antitrust market."[24] Indeed, average prices must be above marginal cost to cover the fixed costs and earn a competitive return on the significant investments required to build and upgrade networks.[25] Thus, the appropriate benchmark for evaluating competition in an industry with significant fixed costs is not whether the industry looks like the perfectly competitive ideal, but rather whether competition among existing firms and entrants is leading to consumer benefits such as lower prices, increased output, and new and improved services.

C. Price Regulation is Usually Not Warranted in Competitive Market Settings

16. The academic economics literature provides some support for the use of price regulation to address monopoly power, but only in the narrow circumstance of a natural monopoly with declining average costs.[26] Special access price regulation began during a period of monopoly control of local access services, and may have been justified in those circumstances. But since then, entry by competitive fiber providers, cable companies and fixed wireless providers has transformed the competitive landscape for the provision of high-capacity services, with ILEC special access services competing for customers with

[24] *Antitrust Modernization Commission Report and Recommendations,* April 2007, p. 40. ("AMC Report") See also Kaplow and Shapiro (2007), p. 1088: "In any event, as with all measures of technical market power, it is important to keep in mind the distinction between the extent of market power and whether particular conduct should give rise to antitrust liability. For example, as we have already noted, *especially in industries in which marginal cost is below average cost and capacity constraints are not binding, nontrivial technical market power may be consistent with what are normally considered competitive industries.*" (Emphasis added.)

[25] See, e.g., Department of Justice *Ex Parte* Submission, In the Matter of Economic Issues in Broadband Competition, GN Docket No. 09-51, January 4, 2010, p. 7: "In markets such as [broadband services], with differentiated products subject to large economies of scale (relative to the size of the market), the Department does not expect to see a large number of suppliers. Nor do we expect prices to be equated with incremental costs. If they were, suppliers could not earn a normal, risk-adjusted rate of return on their investment in R&D and infrastructure."

[26] See Carlton and Perloff (2005), pp. 691-692, for a discussion of natural monopoly. See also W. Kip Viscusi, Joseph Harrington and John Vernon (2005), "Economics of Regulation and Antitrust," MIT Press, 4th ed., 2005, pp. 401-408.

providers using several other technologies. Economists recognize that regulation of an industry that is no longer a natural monopoly can be welfare reducing.[27]

17. Even in a natural monopoly setting, two additional conditions must be satisfied for price regulation to be welfare-improving. First, the costs of regulation must not exceed the benefits of regulation (i.e., the cure must not be worse than the disease). Second, the regulator must have information sufficient to identify appropriate prices.[28] These conditions are difficult to satisfy in general, because regulators inevitably operate with limited, imperfect information about the demand and cost conditions that characterize an industry.[29] While prices in competitive markets are set by the micro-decision making of many market participants, in a regulatory environment explicit decisions must be made about the appropriate prices across a full range of service offerings. Regulation becomes particularly challenging in a market setting such as the provision of high-capacity services, where market demand and underlying technologies both are rapidly evolving. Thus, even if the Commission were to find that competition for the provision of high-capacity services was less than perfect, it does not follow that price regulation should be maintained or expanded.[30]

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[27] See Viscusi, Harrington and Vernon (2005), p. 552: "[T]here should be no presumption that an industry that is a natural monopoly today will be a natural monopoly tomorrow. Just as much as regulating a natural monopoly can be welfare-improving, regulating an industry that is no longer a natural monopoly can be welfare-reducing." See also Howard A. Shelanski (2007), "Adjusting Regulation to Competition: Toward a New Model for U.S. Telecommunications Policy," *Yale Journal on Regulation*, Vol. 24, No. 1, p. 77: "[T]he benefits of regulation diminish as markets become competitive, while the costs of regulation remain and even increase as that transition occurs. Regulatory costs that might result in a net benefit in the presence of monopoly become less likely to do so as a market moves away from a single-firm structure."

[28] See Carlton and Perloff (2005), p. 698; Viscusi, Harrington and Vernon (2005), p. 552.

[29] See, e.g., Viscusi, Harrington and Vernon (2005), p. 552: "Even in a static setting, a regulatory agency must attempt to set the socially optimal price in spite of having very limited information about cost and demand conditions. The problems become even more difficult when the environment changes in significant ways over time." See also Shelanski (2007), p. 78.

[30] If considering the need for regulation, the relevant question is not the performance of the market relative to perfect competition or a similar benchmark, but rather whether *ex ante* regulation can improve the performance, however imperfect, of the unregulated market. See, e.g., Shelanski (2007), p. 77: "... it is not necessary that the telecommunications market be so competitive that it will perform according to some idealized, textbook model of perfect competition. Instead, the relevant question is whether continued, *ex ante* regulation will improve the functioning of the market compared to what would result under market-based competition." See also Robert Harris and C. Jeffrey Kraft (1997), "Meddling Through: Regulating Local Telephone Competition in the United States," *Journal of Economic Perspectives*, p. 110: "The existence of market imperfections, in and of itself, does not offer sufficient justification for a high degree of intrusive regulations. Regulators should remember that competitive

18. The risks of a flawed regulatory system are substantial. Price regulation intended to correct for monopoly power can create its own distortions in resource allocation.[31] These distortions arise because with price regulation, buyers and sellers base their decisions on the value the regulator assigns to goods and services. For example, regulated prices that are set above competitive levels will encourage inefficient firms to remain in the market and will encourage inefficient entry. In contrast, regulated prices that are set below competitive levels discourage entry by new competitors, reduce incentives for investment and expansion by existing firms, and reduce dynamic efficiency. Price regulation can also distort buyer decision making, such as the decision to self-supply.[32] Thus, a well-intentioned Commission effort to increase regulation of special access services may impede the very competitive process that the Commission seeks to foster.[33]

19. Economists recognize the importance of investment and innovation in increasing consumer welfare.[34] Sound regulatory policy should account for the effect of price regulation on incentives for investment and innovation. High-capacity services, and the downstream markets they serve, are evolving, and proper incentives must be in place to encourage deployment of new and more efficient technology. Incentives for innovation and investment in the provision of high-capacity services depend on expectations of the

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forces work powerfully and for the benefit of consumers, even in markets that are far from perfectly competitive."

[31] See, e.g., Paul Joskow and Nancy Rose (1989), "The Effects of Economic Regulation," in Richard Schmalensee and Robert Willig (eds.), *Handbook of Industrial Organization*, North Holland, Vol. 2, Ch. 25, p. 1477: "When regulation is less than ideal, as it necessarily is in practice, its implementation may give rise to a host of production distortions."

[32] See, e.g., Robert Harris and C. Jeffrey Kraft (1997), pp. 99-100, discussing the growth of private, self-supplied networks for local telecommunications services: "...there is reason to believe that...private networks exist only because of regulations that require local exchange carriers to use non-economic pricing and/or that inhibit new service offerings. In these cases, self-supply through private networks would not exist in the absence of regulatory distortions and may well be contrary to economic efficiency and other public policy objectives."

[33] See, e.g., Shelanski (2007), p. 65: "Even where monopoly exists, government should use price regulation sparingly because regulation has harmful incentive effects that can impede the development of competition. Government-imposed price limits may diminish incentives for the incumbents or potential challengers to innovate, reduce profit opportunities that attract new entrants, and ultimately entrench both a particular provider and a particular technology in the market, to the detriment of consumers."

[34] For example, in his testimony to the Antitrust Modernization Committee, economist Richard Gilbert stated that "dynamic competition to develop new products and to improve existing products can have much greater impacts on consumer welfare than static price competition." Richard Gilbert (2005), "New Antitrust Laws for the 'New Economy'?" Testimony before the Antitrust Modernization Commission, November 18, 2005.

future market environment, including future regulation. For any investment to take place, firms have to believe they will be better off from having made the investment than not. If regulatory policy reduces the returns to investment, at the margin, firms are less likely to invest. The substantial investment in networks used to provide high-capacity services, especially investment that is made well ahead of when demand becomes certain, involves substantial risk. Hence any investment requires that there be an appropriate risk premium when evaluating a firm's investment decisions.[35] If the future regulatory environment is uncertain and unpredictable, then incumbents and new entrants will have less incentive to invest in and deploy new facilities and services.[36] Regulators thus need to commit to a regulatory framework that is guided by a consistent, coherent framework.

20. Given the significant welfare costs of price regulation, the general policy goal of the Commission with respect to special access services should be to promote the development of a competitive marketplace, with regulatory intervention reduced and eventually eliminated as the marketplace becomes more competitive. Moreover, because the high-capacity services industry and the downstream markets that use high-capacity services are evolving rapidly, the Commission should avoid adopting a rigid regulatory approach that will soon be out of date. The approach taken by the Commission, as reflected in the Pricing Flexibility Order, has generally followed these principles, by adapting and relaxing regulation in different geographic areas as various competitors have deployed irreversible sunk investment in ILEC wire centers to compete with regulated ILEC special access services. The Commission should continue to follow its deregulatory approach, and exercise caution in evaluating the need for additional regulation of special access services.

IV. Economic Framework for Analyzing the High-Capacity Services Marketplace

21. In today's telecommunications environment, ILEC DS-1 and DS-3 special access services are just one of several high-capacity services technologies used by

[35] See Kaplow and Shapiro (2007), pp. 1088-1089.

[36] See, e.g., Shelanski (2007), p. 93: "[E]specially in a market in which technology is advancing and investment in new technology is important, any regulation that got prices wrong by trying to push margins to the 'perfectly' competitive level would risk deterring investment and competitive entry."

telecommunications carriers and enterprise customers. Because regulated special access services compete with other technologies and are part of a broader marketplace for high-capacity services, the Commission's analytical framework for assessing regulation of special access services should appropriately account for the economic characteristics of the high-capacity services industry. In the next several sections, I consider several economic features of the high-capacity services industry that are relevant for the Commission's analytical framework.

A. Analytical Framework Should Analyze Market Performance as Well as Market Structure

22. The Commission's analytical framework should analyze market performance metrics such as prices, output, entry, changes in demand and cost conditions, and the degree of competition among providers, as well as market structure. Market structure metrics such as market shares are not a sufficient basis for evaluating the competitiveness of high-capacity services. Economists have long recognized that measures of concentration do not provide conclusive evidence on the competitiveness of markets.[37] Even in highly concentrated markets, producer rivalry can lead to competitive outcomes. Rather than suggesting anticompetitive conduct or supracompetitive margins, an increase in concentration or the exit of certain firms may instead reflect vigorous competition as a more efficient or innovative firm takes market share away from rivals.[38] Moreover, market shares need to be calculated for a relevant product market that includes all services that are functional alternatives for buyers, including the option for buyers to self-supply and for suppliers outside the "market" to respond to profitable opportunities. In a dynamic marketplace, current market shares would likely understate the competitive significance of emerging technologies that offer lower costs, better features, or other characteristics that suggest growing market acceptance.

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[37] Carlton and Perloff (2005), pp. 255-274. See also Viscusi, Harrington and Vernon (2005), p. 156: "Note that a concentration index is exclusively concerned with actual competition and ignores potential competition. For this reason, a concentration index cannot fully assess the competitiveness of a particular industry."

[38] See Harold Demsetz (1973), "Industry Structure, Market Rivalry, and Public Policy," *Journal of Law and Economics*, April 1973, Vol. 16, No. 1, pp. 1-9.

23. Because of these considerations, the Department of Justice and Federal Trade Commission often calculate Herfindhal-Hirschman Indices (HHIs) when evaluating the competitive effects of a merger, but supplement that evidence with a wide variety of other market factors, including the nature of competition in the industry, the presence of potential competition and supply side substitution, the "timeliness, likelihood, and sufficiency" of committed entry as a countervailing force against competitive harm, and the existence of recent or on-going changes in market conditions.[39] Similarly, in its annual analysis of competitive conditions in the CMRS market, the Commission reviews and analyzes data using a structure-conduct-performance framework that explicitly recognizes the importance of evaluating provider conduct, consumer behavior and market outcomes, in addition to analyzing measures of market structure.[40]

B. Analytical Framework Should be Forward-Looking

24. The Commission's analytical framework should also be forward-looking. The high-capacity services industry (and, indeed, the telecommunications industry as a whole) has changed substantially in the ten years since the Commission issued the Pricing Flexibility Order. The pace of change has only accelerated in recent years. Market observers forecast additional, dramatic increases in demand for high-capacity services due to the emergence of wireless broadband and the development of new, bandwidth-intensive broadband applications such as video. As I describe below, the rapidly growing demand for backhaul for mobile wireless carriers and transmission of enterprise traffic has created market opportunities for cable companies, fixed wireless providers, and competitive fiber providers to compete with incumbent LECs to provide high-capacity services.

25. Given the rapid pace of change and innovation in the high-capacity services marketplace, a static snapshot of historical or current market conditions is a poor indicator of longer-run competitive conditions and, as such, a poor basis for the development of sound regulatory policy. In the long run, innovation accounts for the

[39] U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines," Issued April 2, 1992 and Revised April 8, 1997. ("Horizontal Merger Guidelines")

[40] See, e.g., Thirteenth CMRS Competition Report.

preponderance of consumer benefits in dynamic industries.[41] An analysis of competitive conditions and the current regulatory regime should therefore adopt a forward-looking approach that explicitly acknowledges changing industry conditions.[42]

C. The Commission's Analysis Should Consider all Competing Technologies and Services

26. In assessing the competitiveness of high-capacity services, the focus should be from the perspective of purchasers, and include all technologies that purchasers view as viable alternatives. Thus, the Commission should consider the full range of alternatives available to buyers of high-capacity services. The high-capacity services industry has changed dramatically from the 1980s when the Department of Justice broke up the integrated Bell System to form the Regional Bell Operating Companies. Today, ILEC-provided DS-1 and DS-3 special access services are just one of several competing forms of high-capacity services available to buyers. ILECs face increasing competition from a wide variety of high-capacity service providers, including fiber-based competitive providers (often described as competitive access providers (CAPs) or competitive local exchange carriers (CLECs)), cable operators, and fixed wireless providers. In addition, providers and enterprise customers have the opportunity to self-supply rather than purchase high-capacity services. The competitive impact of these alternatives should be accounted for in the Commission's analysis of the current regulatory regime. I provide an overview of competing providers of high-capacity services in the next several sections.

1. Competitive Fiber Providers

27. Traditional fiber-based competitors offer alternatives comparable to ILEC special access services, including DS-1 and DS-3 special access service, higher capacity OC-x

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[41] Testimony of Carl Shapiro before the Antitrust Modernization Commission, November 8, 2005, p. 2.

[42] The Department of Justice made a similar recommendation in its recent *ex parte* submission to the Commission. Department of Justice Broadband NOI *Ex Parte*, p. 6: "In any industry subject to significant technological change, it is important that the evaluation of competition be forward-looking rather than based on static definitions of products and services. Insight can best be gained by looking at product life cycles, the replacement of older technologies by newer ones, and the barriers facing suppliers that offer those newer technologies." See also AMC Report, pp. 39-40, noting that "antitrust enforcers should carefully consider market dynamics in assessing competitive effects."

services, and packet-switched services such as Ethernet. Competing access providers build networks by deploying a fiber ring in an area of concentrated demand and then complete the "last mile" connection to customer locations either by constructing a "lateral" fiber connection, or by leasing wireline or wireless service from third parties.[43] Competitive fiber providers have typically targeted downtown business districts, office parks, and other areas of significant demand. According to a 2009 USTelecom report, 28 different competitive fiber providers have installed fiber in the 50 MSAs with the highest level of demand for special access services, and an average of six fiber competitors are present in top 50 MSAs.[44] These competitive fiber providers include AT&T, Verizon and Qwest operating outside their home regions, nationwide companies such as Level 3, tw telecom, and XO Communications, and regional providers such as AboveNet, ITC^Delta.Com, and One Communications.[45]

28. Competitive fiber providers offering comparable high-capacity services serve as an important check on ILEC pricing conduct for DS-1 and DS-3 services. In addition, network capacity used by competitive fiber providers to supply higher-capacity services represents an additional source of potential competition in the supply of DS-1 and DS-3 services. In response to an increase in the price of DS-1 and DS-3 services above competitive levels, fiber facilities used for higher capacity services could potentially be redeployed to provide comparable high-capacity service. Potential supply substitution of higher-capacity competitive fiber services should therefore be considered in assessing the

[43] See Level 3 Communications Form 10-K, period ending December 31, 2008, p. 6: "We...selectively extend the current reach of our existing metropolitan networks by opportunistically adding additional connections to buildings and other traffic aggregation points from these networks. These connections will enable us to reach additional potential customers and reduce our costs for the termination of our customers' communications traffic on other carriers' networks."

[44] Patrick Brogan and Evan Leo, "High-Capacity Services: Abundant, Affordable, and Evolving," USTelecom Report, July 16, 2009, p. 24, available at http://www.ustelecom.org/uploadedFiles/News/News_Items/High.Capacity.Services.pdf. ("USTelecom Report")

[45] For example, Level 3 serves 145 different North American markets over a network of 67,000 intercity route miles, and operates metropolitan fiber networks in North America and Europe. See Level 3 Form 10-K, period ending December 31, 2008, pp. 7, 14, 16. tw telecom operates metropolitan networks in 75 U.S. markets; 9,600 buildings connect directly to these networks. See tw telecom Form 10-K, period ending December 31, 2008, pp. 1, 11. AboveNet operates metropolitan fiber networks in 14 U.S. markets. See AboveNet Form 10-K, period ending December 31, 2008, p. 1.

competitiveness of DS-1 and DS-3 special access services, consistent with the approach adopted by the DOJ and FTC with respect to production substitution.[46]

2. Cable Providers

29. Cable operators provide high-capacity services that compete with ILEC special access services on several fronts. Cable operators have aggressively targeted the millions of small- and medium-sized businesses within the footprint of their existing cable networks.[47] They have upgraded their cable infrastructure so that the same network facilities used to supply residential broadband service can also serve the data requirements of small- and medium-sized businesses. Because services are supplied over an existing network, limited incremental investment is required for customer acquisition; one analyst puts the total cost serving a new small business customer at less than $1,000.[48] All of the major cable providers – Cablevision, Comcast, Cox, Charter, and Time-Warner Cable -- have identified this market as a significant growth opportunity; they expect 15-20% growth in business services revenue, and expect to claim a 20-25% share of the business within the next few years.[49] Cable operators have also invested in large-scale fiber networks to provide service to larger business enterprises, and are actively competing to supply wireless backhaul service to mobile carriers.[50]

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[46] See Horizontal Merger Guidelines, § 1.321: "...[T]he potential for production substitution or extension may necessitate treating as market participants firms that do not currently produce the relevant product. If the firm has existing assets that likely would be shifted or extended into production and sale of the relevant product within one year, and without incurring significant sunk costs of entry and exit...the Agency will treat that firm as a market participant."

[47] Comcast, for example, states that its network passes approximately 5 million SMBs that spent $12-15 billion on telecommunications services in 2008. See Raymond James Equity Research, *Examining the Convergence of the Telecom and Cable Sectors*, August 18, 2008, p. 9. ("Raymond James Report")

[48] See Raymond James Report, p. 9.

[49] See, for example, Comcast, "3rd Quarter 2009 Results Presentation," November 4, 2009, p. 11. See also "Cable Sets Business Sights Higher," *Light Reading*, November 30, 2009, which notes that "[o]ver the past year, all five of the biggest MSOs in the U.S. have notched sizable gains in commercial services...." Time-Warner, Comcast, Cox, and Charter recorded business services revenue growth of 15%, 49%, 16%, and 13%, respectively.

[50] See Raymond James Report, p. 16: "The cable industry is well positioned to capture a portion of the [backhaul] market owing to the extensive reach of its high capacity plant as well as its neutrality." See also "Comcast Corporation at Bank of America Media, Communications and Entertainment Conference," *CallStreet*, Transcript, September 9, 2009, p. 9. ("CallStreet Comcast Transcript") According to Comcast COO Brian Burke, backhaul for wireless networks is "a very substantial opportunity" and "the cable industry is very uniquely positioned because we have fiber close to a lot of these towers." See also FiberTower Form 10-K, period ending December 31, 2008, p. 11, noting that it faces competition from

30. The geographic presence of cable networks complements the geographic presence of traditional competing carriers. While facilities-based investment by competitive fiber-based carriers is typically concentrated in urban areas with high demand, cable networks have an extensive footprint in residential areas. Cable effectively "fills in the map" by providing a source of actual or potential competition in areas that have not been as targeted by traditional competing suppliers of high-capacity services.[51]

3. Fixed Wireless Providers

31. Fixed wireless technology is also being used to provide high-capacity services, and is another viable alternative to ILEC special access services. Fixed wireless providers offer high-capacity services ranging from DS-1 to OC-x and Gigabit Ethernet. Fixed wireless providers have acquired significant spectrum, and more than a dozen fixed wireless providers now offer service in various locations, including most of the largest MSAs.[52]

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cable network operators seeking to provide backhaul for wireless networks: "Cable multiple system operators...including Cox, Time Warner Cable, Bright House and Comcast, among others, are moving to offer broadband access over their networks and offer or are considering offering backhaul services." See also "Big Cable Operators Expect Large Commercial Service Revenue Gains," *Communications Daily*, January 5, 2010: "...cable operators are trying to expand in the business telecom market. They're rolling out more advanced phone services, winning more cellular backhaul contracts from wireless providers, installing direct fiber links to larger commercial customers, and introducing targeted business video services, among other things. They also plan to offer newer services such as cloud computing and wireless broadband."

[51] See, for example, Supplemental Reply Comments of AT&T Inc., In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 15, 2007, p. 20: "All of the major cable companies...are today competing aggressively in the provision of DSn-level special access services or are poised to do so, *particularly in more remote areas outside commercial centers where they have the advantage of much deeper fiber/coax deployment nearer more customer premises*." (Emphasis added.)

[52] PAETEC serves over 84 of the top 100 Metropolitan Statistical Areas. See http://www.paetec.com/about-us/markets-served.html. Clearwire provided "pre-WiMax" networks in 46 markets as of December 31, 2008, and WiMax service in 25 markets as of November, 2009, and planned to extend service to "more than 80 markets, including 75% of the top 50 markets…by the end of 2010." These networks rely "almost exclusively" on microwave backhaul. See Clearwire Form 10-K, period ending December 31, 2008, pp. 13, 15; "Clearwire Reports Third Quarter 2009 Results," available at http://newsroom.clearwire.com/phoenix.zhtml?c=198722&p=irol-newsArticle&ID=1353840; and Clearwire Q4 2008 Earnings Call Transcript, available at http://seekingalpha.com/article/124559-clearwire-corporation-q4-2008-earnings-call-transcript ("Clearwire Q4 2008 Transcript"). Finally, FiberTower operates in 13 "major markets" and holds spectrum licenses that cover 99% of the United States. See http://www.fibertower.com/corp/company-market-presence.shtml.

32. The cost characteristics of fixed wireless are particularly attractive. Network construction costs are relatively low,[53] and the incremental costs required to add users to a fixed wireless network are variable (i.e., recoverable) rather than sunk (i.e., not recoverable). While wireline networks require sunk investment in a physical link to a customer's location, the primary incremental costs required for fixed wireless service are a line-of-sight connection to a network transmitter, a rooftop antenna, and a connection to the roof. Given this cost profile, fixed wireless providers have been entering into new service areas and expanding service within existing areas.[54] Fixed wireless providers have targeted several different user segments, including enterprise customers, wholesale service to telecommunications carriers, and wireless backhaul.

4. Self-Supply

33. Telecommunications carriers providing high-capacity services to end users can use various combinations of their own facilities and facilities leased from ILECs and other providers. For example, a fiber-based CLEC providing services to an enterprise customer can often use a combination of its own facilities and leased high-capacity services to connect a particular customer premises to its fiber ring. Similarly, a wireless provider can lease high-capacity services for wireless backhaul or self-provision using its own fiber or fixed wireless backhaul. For example, Clearwire, which offers both mobile and fixed wireless broadband service to consumers and businesses, relies on its own fixed wireless network for backhaul from towers to its core network.[55] Certain large enterprise customers and municipalities also engage in self-supply, building their own networks rather than purchasing high-capacity services from a telecommunications carrier.[56]

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[53] For example, Clearwire describes the cost of microwave-based backhaul in its network as "negligible." See Clearwire Q4 2008 Transcript, p. 6. See also Frost and Sullivan, *Wireless Service Provider Spending on Mobile Backhaul Services*, 2008, ("Frost and Sullivan Report"), pp. 1-12: "Companies such as FiberTower have been providing wireless equivalent of T1 [backhaul] links at a competitive cost for some time now." See also FiberTower Form 10-K, period ending December 31, 2008, p. 4: "Our network is designed to be modular and is relatively inexpensive to deploy as compared to fixed wireline networks."

[54] See, e.g., Towerstream Form 10-K, period ending December 31, 2008, p. 2: "We believe there are significant market opportunities beyond the nine markets in which we are currently offering our services. Our long term plan is to expand nationally into other top metropolitan markets in the United States."

[55] See Clearwire 2008 Form 10-K, p. 15.

[56] For example, Hewlett Packard's Enterprise Services Division (formerly EDS) operates a self-supplied network to provide IT services to its clients. See http://h10134.www1.hp.com/services/advantage/gsn/.

34. For each link in their networks, providers make choices between self-supplying or purchasing services from an outside supplier. Large enterprise customers with the ability to self-supply are faced with the same choice. Self-supply is a common feature in many industries,[57] and reflects the tradeoff between the cost of self provisioning and the prices available for purchasing services. Self-supply has several implications for an analysis of the marketplace for high-capacity services. First, self-supply serves as an additional competitive check on the pricing power of existing firms, and should be considered in the Commission's analysis of high-capacity services.[58] Second, existing price regulation affects self-supply decisions. If regulated ILEC special access prices are set below competitive levels, then carriers and enterprise businesses will tend to over-purchase special access at the low regulated prices and rely less on self-supply. If regulated ILEC special access prices are set above competitive levels, then carriers and enterprise businesses will tend to engage in more self-supply. Second, self-supply serves as an additional competitive check on the pricing power of existing firms, and should be considered in the Commission's analysis of high-capacity services.

5. Competitive Alternatives Provide Pricing Discipline on Special Access Services

35. The Commission's analysis of competition in the provision of high-capacity services needs to account for the price discipline imposed by the competitive alternatives discussed above. If buyers view high-capacity services from competing providers (or self-supply) as an alternative to ILEC-supplied special access, then those alternatives discipline ILEC pricing and should be accounted for in the Commission's analysis.

36. Competing providers need not offer services that are perfect substitutes for ILEC DS-1 and DS-3 services to discipline ILEC pricing of special access services. If enough

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The city of Burlington, VT also operates its own fiber ring. See "Vermont Municipal Fiber Network Is On The Road To Profitability," *Information Week*, September 26, 2007.

[57] See, e.g., Harris and Kraft (1997), p. 98, discussing the importance of self-supply in local telecommunications service: "Because user demands are so highly concentrated in telecommunications services, one of the most important forms of competition is "self-supply" or "contract carriage" set up by large, intensive users like midsize and larger companies and owners of multi-family dwelling units such as high density apartment buildings. These large users can reduce their reliance on the local exchange carrier in one of two ways: by purchasing a private branch exchange or by making direct connections to long-distance companies via satellite or other facilities."

[58] Horizontal Merger Guidelines, § 1.31-1.32.

customers are on the margin of switching to competitive alternatives, a potential price increase will be unprofitable, even if those competitive alternatives use different technologies.[59] Hence the Commission's analysis should consider high-capacity services offered by competing providers even if those services do not rely on the same underlying technology or offer identical product characteristics.

37. Finally, due to the structure of ILEC costs, a relatively modest level of switching to alternative providers will serve as a powerful check on incumbent pricing power. ILECs have large fixed network costs and relatively smaller marginal costs to serve additional users. This cost structure creates a strong incentive for an ILEC to retain a large volume of output over which to spread its fixed costs, because the potential loss of even a small percentage of customers in response to a price increase will disproportionately reduce profits for the ILEC.[60] This incentive arises because with low marginal costs the loss of a customer reduces revenue but does not result in a significant cost savings. As a result, even modest levels of competition from alternative providers will render ILEC price increases unprofitable and serve as a powerful check on incumbent pricing power. This suggests that excluding cable and fixed wireless providers from a competition analysis is not defensible.

D. Analytical Framework Should Account for Increases in Demand for High-Capacity Services

38. The Commission's analysis of competition and evaluation of existing regulation of special access services should also account for the impact of increases in demand for high-capacity services on the current and future competitive significance of different providers of high-capacity services. Analysis of change in market circumstances is a well-established practice that is consistent with the policy of competition authorities.[61] Indeed, the Horizontal Merger Guidelines note that "market share and market

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[59] See, e.g., Shelanski (2007), p. 67: "Therefore, 'bottlenecks' that might appear to exist when markets are defined narrowly in terms of their underlying technologies do not confer market power or provide a basis for regulation if alternative technologies provide economically feasible substitutes."

[60] See, e.g., Shelanski (2007), p. 85; Hausman (2003), p. 226; Jonathan Baker (2006), "Market Definition: An Analytical Overview," Working Paper, p. 18.

[61] See, e.g., Baker (2006), p. 28: "The scope of the product and geographic markets that would be defined to analyze any particular alleged antitrust violation could differ over time as industry conditions change."

concentration data may understate ... the likely future competitive significance of a firm … in the market," and that"[t]he Agency will consider reasonably predictable effects of recent or ongoing changes in market conditions in interpreting market concentration and market share data."[62] In its recent *ex parte* submission to the Commission in the Broadband NOI, the Department of Justice reiterated the importance of accounting for marketplace developments.[63]

39. Such an analysis is particularly important when evaluating a regulated industry. Regulators operate with imperfect information even under the best of circumstances, but given a rapidly changing marketplace in which basic variables such as the level of demand and technological options are shifting, the information problem is particularly challenging and there is a greater risk that price regulation will distort economic incentives and harm consumers.[64] Further, because regulation can be long-lasting and difficult to change, *ex post* adjustment of regulations in response to changes in market conditions are unlikely. Hence the Commission should carefully weigh the significance of recent and ongoing changes in market conditions. In particular, the Commission should consider the implications of significant changes in demand for high-capacity services from enterprise customers and mobile wireless providers.

1. Significant Increase in Enterprise Demand for Packet-Switched Services

40. Business customers, particularly large enterprises, represent an important source of demand for high-capacity services. Demand from business customers typically exhibits a high degree of geographic concentration, as buyers are clustered in downtown cores, business districts, and office parks in major metropolitan areas. Expanding broadband use and increasing corporate network needs are contributing to rapid growth in this industry segment, and demand is shifting from TDM-based services toward packet-

[62] Horizontal Merger Guidelines, § 1.52.

[63] Department of Justice Broadband NOI Ex-Parte Submission, p. 6.

[64] See, e.g., Shelanski (2007), p. 77.

based services (e.g., Ethernet and IP-based services).[65] Cisco forecasts 27% annual growth in IP-based traffic generated by North American businesses from 2008 to 2013.[66] Industry observers project 35-40% growth in wholesale Ethernet services revenue in 2009 and 20.8% annual growth in revenue through 2013.[67] As demand shifts toward Ethernet, historical ILEC dominance in the special access segment is not recurring. For example, in the wholesale market for Ethernet services, the distribution of revenue is relatively even, and competing providers claim a larger share than some ILECs.[68]

41. Competition from cable networks is also changing the competitive landscape with respect to enterprise demand. As noted earlier, all of the major cable operators have identified business services as an important growth opportunity, as they can exploit their existing cable networks to supply data services to small- and medium-sized businesses within their network footprint with little incremental investment.

2. Significant Increase in Demand for Backhaul for Mobile Wireless Networks

42. Backhaul for mobile wireless networks, i.e., transport from cell towers to a mobile carrier's network or switching office, is another significant source of demand for high-capacity services. Consumer demand for wireless broadband services will grow very rapidly through 2012, due to wireless carrier deployment of 3G and 4G networks.

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[65] See "Ethernet Hits the Business User's Spot," *Telecom Magazine*, March 17, 2009: "Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL) are emerging as the de facto choice for customers migrating from traditional T1/T3 circuits, owing largely to the price competitiveness of Ethernet."

[66] See, e.g., "Cisco Visual Networking Index: Forecast and Methodology, 2008–2013," *Cisco Systems White Paper*, June 2008, p. 12, available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf.

[67] See Frost and Sullivan, "U.S. Wholesale Carrier Ethernet Services Markets," Report # N4CD063 (2008) ("Frost and Sullivan Ethernet Report"), pp. 1-2: "As private line and other legacy services are continually replaced with Ethernet, the U.S. wholesale carrier Ethernet services market is expected to reach $1,282 million in 2013, giving this market a CAGR of 20.8 percent from 2009 to 2013." See also "Ethernet Hits the Business User's Spot," *Telecom Magazine*, March 17, 2009: "[W]e expect the Ethernet services market will ... exhibit a near 35-40 percent growth rate."

[68] The top five providers are AT&T, which holds a 27.7% revenue share, Level 3, Cogent, Verizon, and Qwest. See Frost and Sullivan Ethernet Report, pp. 1-34.

Yankee Group forecasts 130% annual growth in end-user demand for wireless broadband services through 2012, and 100% thereafter.[69]

43. Growth in end-user demand for wireless broadband will drive a dramatic increase in demand for backhaul for mobile wireless networks. Raymond James Equity Research predicts threefold growth in revenue over three to five years, from $3 billion in 2008 to $8 to $10 billion.[70] Yankee Group estimates that demand for backhaul capacity will grow by an order of magnitude over five years, from 5 – 10 Mbps per cell site in 2008 to of 50 - 100 Mbps per site in 2012.

44. The increase in demand for mobile broadband services will make the economics of providing backhaul from cell towers much more attractive for a range of competing suppliers. Cell towers that today require backhaul capacity of 5 – 10 mbps will require 50 – 100 mbps by 2012.[71] In addition, wireless carriers are deploying more cell towers to meet the increasing bandwidth demands of 3G and 4G services.[72] The increased demand for backhaul from cell towers is creating market opportunities for competing firms. Industry observers expect that growth in mobile traffic will induce a shift from backhaul based on DS-1 and DS-3 special access services to backhaul based on fixed wireless, cable, and fiber solutions.[73] Because DS-1 and DS-3 facilities will not be sufficient to meet the increased demand for backhaul from cell sites, all suppliers -- ILECs and wireline competitors alike -- will have to build new last-mile facilities. Thus existing investment in last mile copper infrastructure will not serve as a potential source of competitive advantage.

45. Some analysts expect that fixed wireless providers will capture backhaul opportunities at the expense of ILECs due to faster deployment time and reduced capital

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[69] See Yankee Group, *The Inevitable Transformation of the Mobile Internet*, April 2009. See also Yankee Group, *Mobile Backhaul: Will the Levees Hold?*, June 2009, p.7. ("Yankee Group Backhaul Report")

[70] Raymond James Report, p. 16.

[71] See Yankee Group Backhaul Report, p. 4.

[72] Yankee Group Backhaul Report, p. 4. Yankee Group estimates that mobile cell sites will grow from more than 228,000 in 2008 to 300,000 in 2012.

[73] For example, Frost and Sullivan predict that from 2008 to 2013, the number of cell sites using copper-based backhaul will decline by 3.4% annually, while the number of sites relying on fiber- and microwave-based backhaul will increase, respectively, at 16% and 22.9% annually. See Frost and Sullivan Backhaul Report, Figures 1-6, 1-8, and 1-13.

expenditure requirements, and note that some fixed wireless suppliers have chosen to specialize in wireless backhaul service.[74] Industry analysts also note that there is a good business case for cable companies to provide backhaul from cell sites, with the footprint of cable networks providing relatively easy access to cell towers.[75]

E. Entry and Competitor Expansion Discipline the Pricing Conduct of Incumbent Firms

46. From the perspective of a regulator assessing the competitiveness of a regulated industry, entry provides a crucial measure of market performance and efficiency. Evidence of successful and continuing entry constitutes direct evidence that market-based mechanisms for price discipline are functioning and will constrain attempts to charge supracompetitive prices, in which case additional price regulation is likely unnecessary.

47. In the context of high-capacity services, entry has taken three general forms.[76] First, new competitors may enter a geographic area *de novo*, building the facilities required for a network backbone and the additional last-mile facilities necessary to connect end users to the backbone. Second, existing firms may expand their presence in a particular area by constructing new last-mile facilities. Third, firms that had not previously provided high-capacity services can invest in and redeploy their facilities and expand their product offering to include high-capacity services. This is the approach taken by cable companies.

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[74] Yankee Group Backhaul Report, p. 7. See also Frost and Sullivan Backhaul Report, pp. 1-13: "[We] expect microwave/wireless backhaul service providers to emerge as a strong competitor to wireline carriers." See also pp. 1-28: "[I]n 2008, only 3 percent of the cell sites in the U.S. were connected by microwave. We expect this percentage to change to 8 percent by 2013. Microwave/wireless service has proved itself as a reliable alternative to wired services for mobile backhaul. ...[A]s the bandwidth demand increases exponentially, mobile operators are finding it suitable to use microwave-based services for high-density cell sites, where laying fiber is usually an expensive alternative."

[75] See Raymond James Report, p. 16: "The cable industry is well positioned to capture a portion of the [backhaul] market owing to the extensive reach of its high capacity plant as well as its neutrality." See CallStreet Comcast Transcript, p. 9. According to Comcast COO Brian Burke, backhaul for wireless networks is "a very substantial opportunity" and "the cable industry is very uniquely positioned because we have fiber close to a lot of these towers." See also FiberTower Form 10-K, period ending December 31, 2008, p. 11, noting that it faces competition from cable network operators seeking to provide backhaul for wireless networks: "Cable multiple system operators...including Cox, Time Warner Cable, Bright House and Comcast, among others, are moving to offer broadband access over their networks and offer or are considering offering backhaul services."

[76] For a more general discussion of types of entry, see Viscusi, Harrington and Vernon (2005), p. 164.

48. For wireline network operators, *de novo* entry through network construction requires significant sunk investment; these include core network facilities, such as a fiber ring, and last mile facilities necessary to connect customers, such as a fiber lateral or coaxial cable. Such assets are committed to the market until they are economically depreciated. Committed entry implies that the entrant has identified an opportunity to compete profitably in the market on a long-term basis at expected future prices. Costs for *de novo* entry are substantially lower for fixed wireless providers in areas of lower density. Deployment cost is not a function of distance,[77] and according to one provider "[y]ou can literally cover over a hundred miles and you're talking less than $100,000 in equipment rather than millions to put in fiber."[78]

49. A second means of entry comes from existing firms that have constructed core network facilities in a geographic area from which they can deploy facilities to serve additional buildings. The presence of such providers serves as an additional check on the ability of ILECs to exercise market power.[79] Because demand for high-capacity services exhibits a high degree of geographic concentration, many competitive providers have existing networks in areas of high-density demand and can therefore compete for nearby customers by deploying last-mile facilities to a customer's building.[80] For fixed wireless in particular, advances in technology have meant that serving an additional customer can take place relatively quickly and the incremental investment required is small.[81]

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[77] FiberTower, "Deutsche Bank Leveraged Finance Conference Presentation," September 30, 2009, p. 14.

[78] "Pressure Grows on FCC to Release Wireless Backhaul Notice," *Communications Daily*, April 7, 2009, quoting FiberTower executive Joseph Sandri.

[79] See, for example, Horizontal Merger Guidelines, §§ 1.32, 3.0, noting that uncommitted entrants can "deter or counteract the competitive effects of concern" following a merger.

[80] See Level 3 Communications Form 10-K, period ending December 31, 2008, p. 6: "We...selectively extend the current reach of our existing metropolitan networks by opportunistically adding additional connections to buildings and other traffic aggregation points from these networks. These connections will enable us to reach additional potential customers and reduce our costs for the termination of our customers' communications traffic on other carriers' networks."

[81] See FiberTower Form 10-K, period ending December 31, 2008, p. 4: "Our network is designed to be modular and is relatively inexpensive to deploy as compared to fixed wireline networks."; see also p. 6: "Fixed wireless systems are more flexible, less expensive and quicker to deploy than wired networks..."; see also p. 9: "Advances in technology and increased competition among manufacturers have led to the development of new network equipment, such as antennas, which are less costly, more compact and capable of supporting higher transmission capacities. This has led to several economic and operational benefits for us including lower rent expense, reduced structural analysis costs and deployment lead times, increased flexibility in equipment placement, and zoning fee reductions."

50. A third source of entry into high-capacity services comes from cable companies, who have deployed fiber in their existing cable networks, giving them the capability to serve enterprise customers and provide wireless backhaul within their widespread cable footprint. Because the cable infrastructure is already in place, and the incremental investment is relatively small, expansion and potential expansion by cable operators serves as an additional check on ILEC special access pricing.

51. The record in this proceeding provides substantial evidence of successful entry by a variety of high-capacity service providers. Verizon, for example, has provided evidence that as of 2007, it faced an average of nine known competitive providers and no less than two competitive providers in the top twenty-five MSAs it serves (ranked in terms of special access revenue).[82] Verizon has also reported that one or more competing fiber providers has collocated in two thirds of wire centers that account for 80% of Verizon's special access demand.[83] Note that Verizon and other ILECs face additional competition from providers that are not collocated in a wire center. The 2009 USTelecom report further documents entry by competitive high-capacity service providers.[84]

52. Entry and business success by competitive fiber providers, cable providers and fixed wireless providers implies that barriers to entry are not deterring competitive entry. Moreover, the failure or business difficulties of specific individual entrants should not be taken as an indication of a lack of competition. In a competitive market setting, some firms will succeed and others will be less successful or fail, and the focus of competition analysis of competition should be on the competitive process, rather than the success of any individual firm.[85] Entry and the potential for future entry serve as an important check on incumbent pricing power even if some entrants are not successful. Note, however,

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[82] See Comments of Verizon, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25 and RM-10593, filed August 8, 2007, p. 15. ("Verizon 2007 Special Access Comments")

[83] See Comments of Verizon, Attachment D, Declaration of Quintin Lew, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25 and RM-10593, filed June 13, 2005, ¶ 10. ("Lew Declaration")

[84] USTelecom Report (2009).

[85] For example, the Supreme Court stated in 1977 that "antitrust laws, however were enacted for the protection of competition, not competitors." Brunswick Corp. v. Pueblo Bowl-O-Mat, Inc., 429 U.S. 477, p. 488, (1977), citing Brown Shoe Co. v. U.S., 370 U.S. 294, p. 320, (1962).

that the absence of a positive entry trend in a particular geographic area does not imply that incumbents are in fact exercising market power. Rather, it implies only that potential entrants do not expect positive profits at expected post-entry prices.[86]

53. The importance of recent and prospective entry into the provision of high-capacity services has several implications for the Commission's assessment of the current regulatory regime for special access services. First, because cable, fixed wireless, and some fiber competitors bypass ILEC facilities, the Commission should not limit its analysis to facilities-based competitors collocated in ILEC wire centers.[87] Second, given the substantial marketplace evidence of recent entry and plans for further entry, historical market share information based on sales volumes will likely understate the competitive significance of alternative providers. Competitor information that accounts for recent and planned entry and market expansions, as well as current network configurations, is likely to provide a better measure of the market presence of competitors than current sales volumes. Because cable, fixed wireless and competitive fiber providers are able to expand the reach of their networks and serve additional customers at relatively low incremental costs, they would be able to respond to ILEC attempts to raise special access prices above competitive levels. Thus, rather than focusing on current sales volumes, the Commission should account for the ability of competing providers to extend their networks in response to an ILEC price increase. Finally, the Commission should note that price regulation that imposes lower ILEC special access prices will deter entry by competitive providers and thereby stymie the very competitive process that the Commission seeks to encourage.

F. The Appropriate Geographic Scale for Analyzing Competition Should Account for Potential Competition as well as Actual Competition

54. Assessment of the competitiveness of high-capacity services requires a geographic unit of analysis, i.e., a geographic unit or area within which the Commission can examine competition and, if needed, adopt regulatory measures. Some parties to this

[86] A number of different hypotheses might explain a lack of entry. For example, entry may not occur in certain geographic areas simply because the revenue opportunity is either too small or is higher elsewhere.

[87] An analysis based on collocation in ILEC wire centers understates competitive alternatives, because it does not account for pricing discipline from firms that bypass ILEC wire centers.

proceeding call for a granular analysis of competition by city block or by individual building.[88]

55. As a matter of economics, market definition – a collection of products and geographic locations that comprise a "relevant market" – is used to identify the firms that compete with one another in the "market".[89] The geographic dimension of market definition delineates the geographic area within which competition occurs.

56. The choice of geographic scale should reflect the reach or "footprint" of all competing provider networks deployed within a given area. An overly small scale will improperly exclude potential competitors from the market and thereby understate the degree of competition in a given geographic market. For example, if the geographic market is defined at the city block or building level, a competing provider who has no presence within a particular block or building would be excluded from the market despite the fact that buildings within the block are within reach of the competitor's network.

57. Demand for high-capacity services exhibits a high degree of geographic concentration. The concentration pattern has two layers. A subset of MSAs account for the bulk of total demand for high-capacity services, and within high-demand MSAs demand is concentrated further still in a subset of wire centers that serve downtown cores, business districts, office parks and data centers.[90] For example, the USTelecom Report documents that ILEC special access services are concentrated in a relatively small number of wire centers.[91]

58. The high degree of geographic concentration of demand has important implications for the Commission's analysis of geographic market boundaries. In particular, examining competition and administering a regulatory system on a building-

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[88] See, for example, Peter Bluhm and Robert Loube (2009), "Competitive Issues in Special Access Markets," National Regulatory Institute, Revised ed. ("NRRI Report"), available at http://nrri.org/pubs/telecommunications/NRRI_spcl_access_mkts_jan09-02.pdf. See also Comments of T-Mobile, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25, filed June 13, 2005.

[89] See, e.g., Baker (2006), p. 2; Horizontal Merger Guidelines, §§ 1.2, 1.3.

[90] See Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978 (2003) ("Triennial Review Order"), ¶¶ 205, 375.

[91] See USTelecom Report (2009), p. 24.

by-building or block-by-block basis would make little economic sense. Individual buildings and city blocks within the footprint of existing networks are contestable;[92] competing providers can add new last-mile facilities to reach new buildings at a relatively low incremental cost, as explained elsewhere in this report. The presence of competing fiber, fixed wireless, or cable providers anywhere within an area of concentrated demand can serve as a source of potential competition that disciplines incumbent pricing conduct throughout the area, even if competitors have not constructed last-mile facilities to a particular building or city block. Measuring competitors actually present within a particular building or block does not account for potential competition, so an analysis at the building or block level of detail adds little value to analysis at a larger geographic scale that captures the presence of potential competition.

59. The conduct of high-capacity service providers confirms this point. When competitors enter a particular area, they develop business plans, market their services, and build networks with the intent of serving businesses throughout the area. For example, public statements by fixed wireless, cable, and fiber-based competitors as to current and future business prospects do not focus on particular city blocks or buildings, but instead discuss the total number of businesses that fall within the "footprint" or "reach" of their networks.[93]

60. The nature of demand for high-capacity services also curbs the ability of ILECs to price discriminate and impose higher prices where competitors have not entered. Many purchasers of special access and other high-capacity services are large, sophisticated buyers. For example, telecommunications carriers and large business customers operating on a regional or national scale purchase services for multiple locations in

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[92] See William Baumol, John Panzar and Robert Willig (1982), *Contestable Markets and the Theory of Industry Structure*, Harcourt Brace Jovanovich.

[93] For example, tw telecom noted that as of December 2009, nearly 1 million businesses with capacity demand of 2 or more DS-1 lines were located within 1 mile of its fiber network. See tw telecom, "Investor Presentation," December 2009, p. 10 available at http://www.twtelecom.com/files/dec_09_Investor.pdf. Level 3 notes over 100,000 enterprise buildings within 500 feet of its U.S. network. See Level 3, "Bank of America Merrill Lynch Credit Conference Presentation," December 3, 2009, p. 13 available at http://lvlt.client.shareholder.com/common/download/download.cfm?companyid=LVLT&fileid=336602&filekey=f459ee76-92a1-4627-9419-537a42f48e42&filename=BofAML Credit Conference Dec 2009 Investor Presentation.pdf.

different geographic areas.[94] Competitive pressure and the bargaining power of large customers discipline pricing across different geographic regions. In fact, ILECs have introduced contract tariffs (i.e., individually negotiated service contracts) that provide discounts based on total billed revenue; under these plans, buyers receive a discount regardless of the particular location of a circuit.[95] Some of these plans were introduced to accommodate requests from telecom customers and respond to competitive pressure.[96] Total billed revenue plans limit the ability of ILECs to engage in location-based price-discrimination.[97]

61. These economic considerations suggest that the appropriate geographic scale for analyzing the competitiveness of high-capacity services is at the level of wire center clusters, or larger, and that this competition analysis should account for potential competition as well as actual competition. The choice of geographic unit should also be guided by a cost-benefit analysis that balances accuracy in measuring competitive conditions against the cost and feasibility of administering a regulatory regime in narrow geographic areas.[98] For these administrative reasons, the Commission has appropriately adopted the MSA as the geographic unit for administering regulation of special access services.

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[94] See Lew Declaration, ¶ 78: "Many special access customers are interexchange carriers or commercial mobile radio service providers which operate across broad geographic areas with multiple locations, and these sophisticated customers require vendors to offer attractive rates everywhere in order to win their business anywhere. In fact, these types of wholesale customers account for approximately 80 percent of Verizon's special access revenues."

[95] See, e.g., Lew Declaration, ¶¶ 69-74. See also Supplemental Declaration of Quintin Lew, Attachment B to Comments of Verizon, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25 & RM 10593, August 8, 2007, ("Lew Supplemental Declaration"), ¶¶16-21.

[96] See Lew Declaration, ¶¶ 71-74.

[97] See Lew Declaration, ¶ 74: "The region-wide pricing in Verizon's special access discount plans reflects the fact that Verizon does not establish special access rates based on the number of competitors serving a particular building, wire center, or MSA."

[98] The Commission's Pricing Flexibility Order recognized this tradeoff: "[T]he geographic area that it should use for purposes of reviewing requests for pricing flexibility…narrowly enough so that the competitive conditions within each area are reasonably similar, yet broadly enough to be administratively workable." Pricing Flexibility Order, ¶ 71.

G. Volume and Term Discounts Offer Efficiency Benefits

62. The Commission asks whether the terms and conditions in special access discount plans and contract tariffs offered by ILECs are just and reasonable,[99] presumably in response to claims that the terms of certain ILEC discount plans facilitate the exercise of market power, impede the development of competition, and improperly prevent the purchase of unbundled network elements (UNEs).[100] As I explain below, economic analysis suggests that the volume and term discounts and other provisions contained in some ILEC special access discount plans and contract tariffs are mutually beneficial, reflect an attempt by incumbent providers to differentiate their service offerings in response to customer demand and competitive pressure, and can enhance economic efficiency by reducing the costs of customer churn. Finally, allegations of anticompetitive conduct regarding business practices that have procompetitive justifications are best addressed by a focused *ex-post* analysis rather than by *ex-ante* regulatory restriction that will impede beneficial competition.

63. Rate plans for special access services fall into three general groups, all of which are filed as tariffs with the FCC. "Rack" rates specify the monthly price for special access service and typically do not require any commitment with respect to term, volume, or revenue.[101] These rates can be thought of as list prices.

64. ILECs also offer a variety of generally available discount plans that provide significant discounts in exchange for a customer commitment with respect to volume, term, or annual expenditure. Some plans impose liabilities if customers fail to meet the volume or revenue commitments specified as a condition for discounted rates. For example:

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[99] Special Access Public Notice, p. 2.

[100] See, for example, Comments of Sprint Nextel Corporation, GN Docket No. 09-157, September 30, 2009, p. 29. See also Reply Comments of Sprint Nextel Corporation, GN Docket No. 09-157, November 5, 2009, note 8. See also NRRI Report, p. iv.

[101] Some rack rates have a minimum term.

- In 2007, AT&T offered a plan with discounts of 24% to 66% for a customer-selected volume level with a one-year term for DS-1 service, subject to a minimum volume level.[102]

- In 2007, Qwest's primary discount plan provided "meaningful" discounts to customers who agreed to a forty-eight month term and a volume commitment of 90% of the customer's circuit volume level at the time of purchase.[103]

- As of 2009, Verizon offered discount plans that allowed customers to aggregate demand over regions across the country and pay uniform prices regardless of location; plans that allow customers to move individual circuits in and out of service without penalty, subject to a minimum volume commitment; and circuit-specific plans that provide discounts without a volume commitment. Discounts under generally available plans ranged from 5% to 65% off of standard month-to-month rates.[104]

65. Finally, in addition to generally available discount plans, ILECs offer individually negotiated contract tariffs in regions where they have obtained pricing flexibility. These plans contain rate structures that have been negotiated in a contract with an individual customer and subsequently made available by tariff to "similarly situated" customers. Discounts offered under contract tariffs are typically in addition to those available under generally available discount plans.[105]

66. The claim that discounts based on volume, term, and annual expenditure commitments are anticompetitive is difficult to square with the fact that such discounts are a common practice in a number of industries that display vigorous competition, which suggests that such agreements are not generally harmful. For example:

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[102] *Ex parte* letter from Frank Simons, AT&T, to Marlene Dortch, FCC, WC Docket No. 05-25, September 10, 2007. See also Supplemental Reply Comments of AT&T Inc., In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 15, 2007, pp. 61-62.

[103] See Comments of Qwest Communications, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 8, 2007, p. 49.

[104] *Ex parte* letter from Donna Epps, Verizon, to Marlene Dortch, FCC, WC Docket 05-25, Special Access Rates for Price Cap Local Exchange Carriers, October 27, 2009.

[105] See Comments of Qwest Communications, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 8, 2007. pp. 48-49. See also Verizon 2007 Special Access Comments, p. 10.

- Real estate owners offer lower rents to commercial and residential tenants willing to commit to a long-term lease, and leases often specify either loss of a deposit or payment of a specific fee as the penalty for early termination.
- Magazine publishers offer substantial discounts from the rack or newsstand price to customers who commit to a multi-year subscription, and the magnitude of the discount increases along with the term of the subscription.
- Sports teams and performing arts groups offer discounts to subscribers who agree to an annual subscription (i.e., a season ticket) rather than purchasing tickets on a pay-as-you-go basis.

67. Economists generally find that the voluntary, mutually beneficial nature of such agreements makes the prospect of competitive harm unlikely.[106] Customers are not forced to accept the terms of a discount plan or contract tariff; customers and suppliers alike enter these agreements voluntarily, hence both parties benefit.[107] In addition to the obvious benefit of reduced prices, buyers reduce their transaction and search costs and may receive specialized or customized services or contract terms in return for volume and term commitments and agreements to convert UNEs to market-based services.[108] Volume and term commitments and termination liabilities are beneficial to suppliers as well. Term commitments reduce the volatility of a supplier's revenue stream and reduce the risks and inefficiencies associated with customer churn, including higher operating and capital costs,[109] while termination liabilities provide suppliers with a means of

[106] See Richard Posner (1976), *Antitrust Law: An Economic Perspective*, University of Chicago Press.

[107] As a general matter, if relationship-specific investments are an important feature of a vertical (buyer-seller) relationship, buyers and sellers are typically willing to make longer *ex ante* contractual commitments. See Paul Joskow (1987), "Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets," *American Economic Review*, Vol. 77, No. 1, March 1987, pp. 168-185.

[108] Regarding customized services, see Lew Supplemental Declaration, ¶ 14: "Further, carrier customers have expressed interest in specialized Service Level Agreement provisions and it is evident that a 'one size fits all' approach does not meet the needs of the carrier customer." See also ¶¶ 16-20 for a discussion of customized pricing terms offered to carrier customers.

[109] For example, one ILEC observes that volume and term commitments allow it "to better predict volumes and efficiently design its network." See Supplemental Declaration of Parley C. Casto on Behalf of AT&T Inc., In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 15, 2007, ¶ 12. Termination fees also eliminate the cost of enforcing broken fixed-term contracts in the absence of a liquidated damages provision.

recovering investments made in order to provide service.[110] As a result, suppliers can compete more aggressively to win long-term contracts (at the time contracts are initially bid and at contract renewal), and offer lower prices to buyers.[111] ILECs also benefit by reducing sales of UNEs; TELRIC-based UNE prices set by regulation are widely regarded as artificially low.[112] The efficiencies that motivate these contract terms are by no means unique to the ILECs; competing providers engage in similar contracting practices.[113]

68. Moreover, as noted previously, many purchasers of high-capacity services are large, sophisticated buyers who spend hundreds of millions of dollars annually on telecommunications services. They exert their substantial bargaining power by obtaining multiple bids from competing suppliers, switching providers to obtain lower prices and better non-price terms, and using the services of system integrators. The profusion of different tariffs and agreement structures is, if anything, an indication of competition; in order to capture and retain the business of prospective buyers, suppliers offer both price discounts and non-price benefits in a number of different dimensions, including service and simplified administration.

69. Claims that volume and term discounts are anticompetitive rely on a vaguely specified theory of harm in which ILEC contract terms allegedly impose switching costs on customers through a "lock up" provision and create barriers to entry for new

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[110] Qwest, for example, notes that "commitments in terms of time, volume, or both are standard parts of discount plans in competitive markets and necessary for the reasonable recovery of Qwest's investments." Comments of Qwest, Inc., In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 15, 2007, p. 49.

[111] See Greg Houston and Hayden Green (2007), "Assessing the Merits of Early Termination Fees," in Lawrence Wu (ed.), *Economics of Antitrust: Complex Issues in a Dynamic Economy*, NERA, pp. 61-71.

[112] Many economists agree that TELRIC pricing fails to provide a return commensurate with the risk level of sunk investment in network facilities. See, e.g., Hausman (2003), pp. 201-202, 205, 210.

[113] See, e.g., AboveNet Form 10-K, period ending December 31, 2008, p. 23: "A substantial portion of our revenue is derived from multi-year contracts for services we provide. We are often required to make an initial outlay of capital to extend our network and purchase equipment for the provision of services to our customers. Under the terms of most contracts, the customer is required to pay a termination fee or contractual damages (which decline over the contract term) if the contract were terminated by the customer without basis before its expiration to ensure that we recover our initial capital investment plus an acceptable return." See also FiberTower Form 10-K, period ending December 31, 2008, p. 7: "Our customer agreements are generally on three or five year terms, and the T-1 orders under these agreements typically provide for termination liability."

suppliers.[114] The evidence of entry that has been assembled in this proceeding runs directly counter to these claims. Further, these claims ignore the fact that the efficiency benefits of volume and term provisions may *reduce* prices and lead to more competition to win contracts with discount and term provisions.

70. Given the existence of pro-competitive justifications for the use of volume and term discounts in special access contracts, an *ex-ante* regulatory policy that restricts discounting practices would impede beneficial competition and cause economic harm. A more appropriate enforcement regime would examine alleged anticompetitive discounts on a case-by-case basis, much as the antitrust laws examine certain conduct on an *ex post* basis.

H. Declining Special Access Prices are Benefitting Buyers of High-Capacity Services

71. Market power is generally characterized by the ability to increase prices and restrict output. Here the opposite is happening. Evidence presented in this proceeding indicates that special access prices have been steadily declining since pricing flexibility was introduced.[115] Evidence presented in this proceeding also indicates that the quantity ("output") of special access and other high-capacity services has increased significantly over time.[116] This combination of declining special access prices in conjunction with increased output provides direct marketplace evidence that the competitive market setting is benefitting buyers of special access and other high-capacity services. In its analysis of competition in the provision of high-capacity services, the Commission should rely on the existing evidence in the record regarding trends in special access prices.

72. In conducting its analysis of special access prices, the Commission needs to account for several measurement issues. First, analysis of the price of special access

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[114] For example, see footnote 100 above.

[115] See, e.g., U.S. Government Accountability Office (GAO), *"FCC Needs To Improve Its Ability To Monitor and Determine the Extent of Competition in Dedicated Access Services"*, GAO-07-80, November, 2006, ("GAO Report"), NRRI Report, USTelecom Report, and Supplemental Declaration of William E. Taylor on Behalf of Verizon, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25 & RM No. 10593, August 8, 2007. ("Taylor Supplemental Declaration")

[116] Taylor Supplemental Declaration.

services should use the actual prices paid by buyers. A large fraction of ILEC DS-1 and DS-3 services are sold under term and volume discount plans and price flexibility contracts that provide substantial discounts from list prices.[117] Analysis of price trends should incorporate the effect of these discounts. List prices have no economic meaning, since they do not reflect the actual price paid by the buyer. Further, special access prices should be examined in real (i.e., inflation-adjusted) terms to remove the effects of general inflation (i.e., changes in the general price level) and focus on the economically relevant issue, namely the change in the price of special access services relative to other goods.[118].

73. If product characteristics improve over time and prices simultaneously decline, an analysis of price trends will *understate* the decline in quality-adjusted prices. For example, if network reliability has increased over time, and buyers view reliability as a valuable product characteristic for which they are willing to pay a higher price, a hypothetical price decline of 10% in fact represents the sum of two effects: a decline of *more than* 10% in quality-adjusted price (i.e., price holding network reliability constant at its initial level), and a price premium for increased reliability. If, as is likely, the quality of special access services has improved over time,[119] then an analysis showing a decline in inflation-adjusted actual prices, without adjusting for quality, will understate the true price decline as the marketplace for high-capacity services has become more competitive.[120]

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[117] For example, more than 90% of Verizon's special access revenue from wholesale customers is derived from purchases under discount plans, pricing flexibility promotions and contract tariff offerings. See *Ex parte* letter from Donna Epps, Verizon, to Marlene Dortch, FCC, WC Docket No. 05-25, October 27, 2009. The level of discount provided by other ILECs under generally available discount plans is as high as 66%. See *ex parte* letter from Frank Simons, AT&T, to Marlene Dortch, FCC, WC Docket No. 05-75, September 10, 2007. See also Supplemental Reply Comments of AT&T Inc., In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, RM 10593, filed August 15, 2007, pp. 61-62. See also Verizon 2007 Special Access Comments, pp. 7-9.

[118] For example, from January 2001 to November 2009 the general price level as measured by the Consumer Price Index (CPI) increased by 23.5%. See http://www.bls.gov/cpi/cpid0911.pdf, Table 24, p. 71. Given this level of inflation, a hypothetical 25% increase in the nominal (unadjusted) price of a good represents an increase of just 1.2% in the *real* (inflation-adjusted) price, i.e., the price of the good relative to the price of the broad basket of goods that comprises the CPI.

[119] For example, Verizon has recently introduced new service level agreements ("SLAs") that offer customers higher service levels and larger credits in the event that it does not meet service level commitments.

[120] Economists have developed a series of statistical techniques based on hedonic regressions to estimate quality-adjusted prices, but those techniques are difficult to implement and unlikely to be necessary in this

74. Note, however, that declining prices are not a necessary condition for competition; a market in which prices are rising may nonetheless exhibit vigorous competition. Economists recognize that even in highly competitive markets, prices can fluctuate as market conditions change.[121] For example, when demand shifts outward (as it has for wireless backhaul), prices may rise until entry occurs that matches supply to the increased demand. Indeed, it is these price signals that encourage firms to enter markets or expand production. The general downward trend in special access prices since the introduction of pricing flexibility, along with evidence of entry and competition among various firms to provide high-capacity services, indicates that the deregulatory process is bringing benefits to buyers of high-capacity services.[122]

75. Some parties may object that while special access prices have declined, costs may have declined more quickly, and that as a result, the ILECs are earning supracompetitive profits on their special access services. As I explain in the next section, proposals to use accounting data to measure the economic profitability of special access services are flawed as a matter of economics. Calculating the service-specific costs of providing special access services is also not feasible. Special access services rely on shared network resources and assigning those costs to individual services is economically arbitrary. However, it is possible to calculate cost indices that can serve as a proxy for the costs of various components needed to provide special access services. The components required to deploy special access services include network electronics, metallic or fiber cable, conduit, poles, and labor costs. For example, Harold E. West III, Director of Regulatory Support for Verizon, offers the AUS Telephone Plant Index ("TPI") as one means of calculating a cost index for the network components used to

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proceeding. For a discussion of hedonic techniques, see Lars Nesheim (2008), "Hedonic Prices," in Steven Durlauf and Lawrence Blume (eds.), *The New Palgrave Dictionary of Economics*, 2nd ed.

[121] Prices are influenced by a wide variety of variables, including demand, costs, prices for substitute and complementary products, and, in a multiproduct setting such as telecommunications, demand for other services produced using shared network infrastructure.

[122] In analyzing price trends, it is important to account for regulatory factors that influence the time series of prices. If, hypothetically and contrary to fact, price increases occurred after pricing flexibility, that would not necessarily indicate a competitive problem because the price-cap price was set by a regulatory process, rather than the competitive marketplace. The Commission itself has observed that prices may increase under Phase II flexibility because past regulation had set prices below the competitive level. Pricing Flexibility Order, p. 80.

provide special access services.[123] Such an analysis would provide a measure of changes over time in the inflation-adjusted cost of network components necessary to provide special access service that can be compared to the rate of decline in the prices customers pay for special access services.

76. The Commission should consider the results of any such comparison (or the sensitivity of results to the particular cost index used) in the broad context of other evidence of the competitiveness of high-capacity services. More specifically, evidence of successful entry and potential competition by alternative providers implies that competitive mechanisms are functioning well. Thus if, hypothetically, costs were indeed falling more quickly than prices, this will likely be a short run phenomenon; falling costs will spur further entry which will in turn discipline prices.

I. The Commission Should Not Base Its Analysis of Competition on Accounting Cost or Profitability Data

77. Empirical industrial organization (IO) – the field within microeconomics that examines business behavior and its implications for market structure and public policy – has recognized for the last twenty-five years that market power (i.e., supracompetitive margins) must be inferred from firm behavior because economic marginal costs are essentially unobservable and profitability estimates that rely on accounting data are biased, unreliable proxies for economic profits. A widely read article by former DOJ Chief Economist Timothy Bresnahan summarizes the empirical research – the "new empirical industrial organization" -- from which these precepts developed. Bresnahan describes a "dramatic shift" in the focus of empirical analysis that takes "a markedly different view of what can be observed ... than earlier work," and notes the "central idea" that

[123] See Declaration of Harold E. West III. The AUS Telephone Plant Index is used to develop reproduction costs (cost in today's dollars to reproduce the company's embedded plant in service) for telephone operating companies. See http://www.ausinc.com/pub-telephone.html.

> "Firms' *price-cost margins are not taken to be observables*; economic marginal costs (MC) cannot be directly or straightforwardly observed. The analyst *infers MC from firm behavior* ... or comes to a quantification of market power *without measuring cost at all*."[124] (Emphasis added.)

78. This approach was motivated in part by the conclusion that accounting data are not a reliable basis for direct observation of economic profits. Franklin Fisher summarizes this conclusion:

> "... there is no way in which one can look at accounting rates of return and infer anything about relative economic profitability or, *a fortiori*¸ about the presence or absence of economic profits. ... Examination of absolute or relative accounting rates of return to draw conclusions about monopoly profits is a totally misleading enterprise."[125]

79. Differences between accounting and economic profits arise due to, among other things, differences in the valuation of capital (book value vs. replacement cost), differences in depreciation methodology (straight-line depreciation or other methods driven by accounting rules vs. decline in economic value), failure to capitalize intangible assets, and failure to adjust returns for risk.[126] The last concept is particularly important given the relatively high level of sunk cost in telecom-related investments. Accounting profits ignore the concepts of sunk cost and risk, and thereby neglect the economic insight that a risky investment must yield a greater return than a risk-free investment.[127]

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[124] See Timothy Bresnahan (1989), "Empirical Studies of Industries with Market Power," in Richard Schmalensee and Robert Willig (eds.), *Handbook of Industrial Organization*, Elsevier, Ch. 17, Vol. 2, pp. 1012. See also Kaplow and Shapiro (2007), p. 1088: "Marginal cost, by contrast, may be more difficult to measure, due both to difficulties in identifying which costs are variable (and over what time period) and to the presence of common costs that may be difficult to allocate appropriately. In part for this reason, the empirical industrial organization literature, surveyed in Bresnahan (1989), often treats marginal cost as unobservable."

[125] Franklin Fisher and John McGowan (1983), "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits," *American Economic Review*, March 1983, p. 91. See also Richard Schmalensee (1989), "Inter-Industry Studies of Structure and Performance," in Richard Schmalensee and Robert Willig (eds.), *Handbook of Industrial Organization*, Elsevier, Ch. 16, Vol. 2, and Carlton and Perloff (2005), pp. 245-259.

[126] See Schmalensee (1989), pp. 960-965, and Carlton and Perloff (2005), pp. 249-252.

[127] See, e.g., Kaplow and Shapiro, pp. 1089-1090: "In particular, it is often very hard to measure the return on capital earned for a given product, or in a given market, especially for a firm that is engaged in many lines of business and has substantial costs that are common across products. Another problem with this approach is that *the return on capital should, in principle, be adjusted for risk. Frequently, one is looking at a successful firm, perhaps one that has been highly profitable for many years following some initial innovation that*, ex ante, *may not have turned out as well*." (Emphasis added).

80. The general problem with accounting rates of return is further compounded in the case of special access services by the fact that ILECs are multiproduct firms that use shared, common network resources to offer a range of dedicated, switched, and local exchange services.

81. No unambiguous, economically meaningful measure of average cost exists for a multiproduct firm, primarily because it is impossible to separate inputs and outputs in a non-arbitrary manner.[128] These complications spill into the interpretation of costs and margins and assessment of market structure. In particular, given economies of scope in costs,[129] price-cost margins for individual services are likely to be uninformative about competitive conditions because of the arbitrary nature of common cost allocation. For example, Viscusi, Harrington, and Vernon (2005) point out that "the particular method [of cost allocation] may appear quite reasonable, but the essential point is that *it is necessarily arbitrary*. And more importantly, *such cost allocations lead to prices that have no necessary relationship to marginal costs*."[130] (Emphasis added.)

82. Accounting data drawn from the FCC's ARMIS system are no exception to these problems. ARMIS data are based on an economically arbitrary allocation of costs among regulated and unregulated services, and between interstate and intrastate jurisdictions. As such, ARMIS data are wholly unreliable as a basis for ratemaking or computation of economic profits realized on special access services. Moreover, the ARMIS data reflect allocation rules that were frozen in 2001 and are therefore badly out of date.

83. The Commission itself has recognized these points in the past,[131] and should continue to reject any analysis that relies on accounting rates of return to conclude that

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[128] See, e.g., Carlton and Perloff (2005), pp. 50-51; see also Robert Willig (1979), "Multiproduct Technology and Market Structure," *American Economic Revi*ew, Vol. 69.

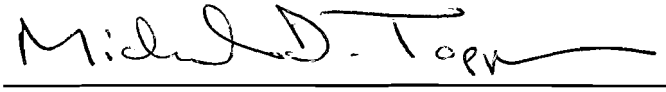
[129] Costs are said to exhibit economies of scope at a given level of output if the total cost of joint production is lower than the combined costs of separate production by different, specialized firms. See Carlton and Perloff (2005), pp. 44-47.

[130] See Viscusi, Harrington and Vernon (2005), p. 444.

[131] The Commission concluded in the Special Access NPRM that "high or increasing rates of return calculated using regulatory cost assignments for special access services do not in themselves indicate the exercise of monopoly power." Special Access NPRM, ¶ 129.

additional regulation of ILEC special access services is warranted.[132] Instead, the Commission should follow accepted economic methods and consider the wide range of marketplace evidence identified throughout this paper – declines in the prices of special access services, increases in output of special access and other high-capacity services, entry by rivals to the incumbent carriers in response to market opportunities, pricing discipline imposed by potential competition, changes in demand and cost conditions – to evaluate the state of competition in high-capacity services and current regulation of ILEC special access services.

I declare under penalty of perjury that the foregoing is true and correct.



Michael D. Topper
Executed January 19, 2010

[132] See, for example, *ex parte* letter from Paul Margie on behalf of the Ad Hoc Telecommunications Users Committee to Marlene Dortch, FCC, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, WC Docket 05-25, October 27, 2009, claiming that ILEC special access rates of return for 2007 ranged from 62% to 175%. See also NRRI Report, pp. 68-71.

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ACADEMIC BACKGROUND

1991 **Stanford University** Stanford, California
Ph.D., Economics, 1991; M.A., Economics, 1989
Specialized in labor economics, public finance, industrial organization and econometrics.

1982 **Stanford University** Stanford, California
M.S., Engineering-Economic Systems

1981 **University of Virginia** Charlottesville, Virginia
B.S., Systems Engineering, with Highest Distinction
Member, Tau Beta Pi

PROFESSIONAL EXPERIENCE

1994 – Present **Cornerstone Research, Inc.** Menlo Park, California
Vice President (Partner)
Head, Antitrust & Competition Practice
Manage and conduct economic analysis for complex business litigation, regulatory and public policy matters, with specialization in antitrust, intellectual property, class certification and breach of contract.

Industry expertise includes telecommunications, media, Internet, information technology, energy, transportation, and financial services.

Expertise includes econometrics, analysis of large datasets and consumer survey design and analysis.

Services to clients include expert testimony, identifying experts, clarifying economic and financial issues, identifying and analyzing data, supporting experts in the preparation of expert reports and testimony, and analyzing opposing expert reports and testimony.

1993 – 2003 **Stanford University** Stanford, California
Lecturer in Economics
Taught courses in microeconomics and antitrust policy for the Department of Economics.

1991 – 1994 **College of William and Mary** Williamsburg, Virginia
Assistant Professor of Economics
Conducted academic research on the economics of education and training programs. Developed new courses in labor and development economics. Helped launch the new graduate program in public policy. Taught core courses in economics and statistics.

Supervised graduate and undergraduate students.

PROFESSIONAL EXPERIENCE (CONT.)

Summer 1986 **Rand Corporation** Santa Monica, California
Summer Research Intern, Telecommunications Policy Group
Developed models for estimating the demand for telecommunications services.

Summer 1985 **International Institute for Applied Systems Analysis (IIASA)** Vienna, Austria
Summer Research Intern, Systems Modeling Group
Programming and analysis for dynamic simulation models.

1981 – 1984 **Bell Laboratories/Bell Communications Research** Holmdel, New Jersey
Systems Engineer
Conducted cost/benefit, technical feasibility and economic cost analyses for advanced switching services based on caller ID.

PUBLICATIONS

"3G Standards Policy: Government Shouldn't Intervene in Debate," *Wireless Week*, December 21, 1998.

"Student Loans, Debt Burdens, and Choice of Major," *New Directions for Higher Education*, 85, pp. 115–124, 1994.

"The Impact of the Demographic Transition on Government Spending," with John Shoven and David Wise, In David Wise, ed., *Economics of Aging*, University of Chicago Press, 1994.

"The Cost of Capital in Canada, the U.S. and Japan," with John Shoven, In John Shoven and John Whalley, eds. *Canada-U.S. Tax Policy Issues*, University of Chicago Press, 1992.

WORKING PAPERS

"An Antitrust Analysis of the Case for Wireless Network Neutrality," with Gregory L. Rosston, *Stanford Institute for Economic Policy Research Discussion Paper 08-040*, July 2009. Accepted, *Information, Economics and Policy*

"Economic White Paper on National Third Generation Wireless Standards," with Joseph Farrell, *Mimeo*, November, 1998.

CONFERENCE PARTICIPATION, PANEL PARTICIPATION AND INVITED TALKS

"Modernization of Antitrust Law," Stanford University Conference, May 29–30, 2008, Panelist/Discussant.

"Third Generation Wireless Standards Policy," Presentations in Washington D.C., December 1998.

"Higher Education and the American Worker," Christopher Wren Society, Williamsburg, VA, April 1993.

"The Impact of the Demographic Transition on Government Spending on Individuals," with John Shoven and David Wise, NBER Conference on the Economics of Aging, July 1992.

CONFERENCE PARTICIPATION, PANEL PARTICIPATION AND INVITED TALKS (CONT.)

"Ethnic Differences in Schooling Attainment in Malaysia—A Difference in Differences Approach," Paper presented at Southeast Asian Educators Workshop, Stanford University, July 1991.

"The Cost of Capital in Canada, the U.S. and Japan," with John Shoven, NBER Conference on Canada–U.S. Tax Comparisons, July 1990.

EXPERT TESTIMONY

Federal Communications Commission, Mobile Wireless Competition Notice of Inquiry, WT Docket No. 09-66. Filed declaration on behalf of client Verizon Wireless, September 2009.

Copyright Royalty Board, In the Matter of Distribution of the 2004 and 2005 Cable Royalty Funds, Docket No. 2007-3 CRB CD 2004-2005. Filed testimony on behalf of client National Association of Broadcasters, December 2009.

FELLOWSHIP AND AWARDS

Center for Economic Policy Research, Stanford University
Visiting Scholar, 1993–1994

Department of Economics, Stanford University
Distinguished Teaching Award, 1989

Rand Corporation
Graduate Student Summer Fellowship, 1986

International Institute for Applied Systems Analysis
American Academy of Sciences Young Scientists' Summer Program Fellowship, 1985

Bell Laboratories
Graduate Fellowship, 1981–1982